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PATENT SPECIFICATION

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(54) RESILIENT ENGINE-MOUNTING

(71) We, CONTINENTAL GUMMI-WERKE AKTIENGESELLSCHAFT, of Continental-Has/Postfach 169, 3000 Hannover, Germany; a German body corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a resilient mounting, more especially for the engine of an automotive vehicle, the mounting comprising an inner sleeve and a substantially shorter outer ring and an annular rubber body clamped therebetween. The rubber body is loaded mainly axially in use and is provided at both ends with beadings which project beyond the inner diameter of the outer ring and are supported on the radial end faces thereof.

In known mountings, in which there is no adhering connection between the rubber body and the metal parts, considerable difficulties are encountered in firmly retaining the inner sleeve to prevent axial displacement and reduce friction and heating.

The object of the present invention is to provide a mounting in which the location of the inner sleeve is ensured by suitably shaping and dimensioning the rubber body. This location is effected by firmly locating the beadings with respect to the radial end faces of the outer ring. This enables a relatively soft characteristic mounting to be provided.

According to the present invention there is provided a resilient mounting, more particularly for the engine of an automotive vehicle, the mounting comprising an inner sleeve and a substantially shorter outer ring with an annular rubber body clamped therebetween, the rubber body comprising an inner part located substantially between the outer ring and the inner sleeve and having an annular beading at each of two end regions which extend beyond the inner diameter of the outer ring with said beadings being supported on radial end faces of the ring, wherein the inner part has a substantially frusto-conical recess at each end face and is shorter than the inner sleeve but longer than the outer ring; each beading being provided with a collar portion extending towards the central axis of the rubber body and tapering into a lip.

In this mounting and at any one time, only one of the beadings abutting the outer ring at the radial end faces is used to carry a static load, which beading due to the inwardly facing collar portion integral therewith initially expands away from the inner sleeve by bending, though further loading progressively increases the resistance characteristic. The inner part of the rubber body is of shorter axial length adjacent the inner sleeve and is able to follow axial displacements of the inner sleeve. The rubber body is also capable of absorbing transverse forces, i.e. forces acting at right angles to the mounting axis, to an adequate extent. The rubber body includes the inner part located between the sleeve and ring which absorbs transverse forces and which is adapted to yield to axial displacements. The inner part includes end regions having portions forming the beadings which may absorb axial forces and transmit them to the outer ring. The outer surfaces of the collar portions are preferably frusto-conical with the smaller ends of these portions facing away from each other so that the portions, when acted upon by the load, abut progressively against the surface of the inner part of the rubber body.

Preferably an outer surface of each beading is at a right angle to the outer surface defining each adjacent collar portion.

To facilitate assembly of the mounting the rubber body is composed of two parts

each having a beading with a parting plane extending within the outer ring. It is particularly desirable that the two parts are provided with hollow-cylindrical telescoped portions, the axial length of each of which is substantially the same as that of the outer ring, the parts being interlocked. These two portions interengage by means of a ridge on one which fits into a channel in the other.

It is also possible for the inner sleeve and outer ring, or one of such components, to be divided in a continuation of the parting plane of the rubber body. Finally, it is also advantageous to prevent shifting of a beading on the adjacent surface of the outer ring by providing one or both beadings with an annular rib which engages in an annular groove on a radial end face of the outer ring.

Reference is now made to the accompanying drawings, in which:

Fig. 1 is an axial section through one half of an unloaded, non-stressed mounting;

Fig. 2 is an axial cross-section through the mounting of Fig. 1, in a stressed state,

Fig. 3 is an axial cross-section through one half of an alternative mounting; and

Fig. 4 shows an axial cross-section through the mounting of Fig. 3 in a stressed state.

In Fig. 1 a rubber body is shown having an inner part 1 with an axial aperture and mounted on an inner sleeve 2 with its outer surface in contact with an outer ring 3 which is provided at both ends with radial end faces 4. The rubber body has beads 5 which extend axially beyond the length of the inner part of the rubber body 1 and are supported on the end faces 4 of the outer ring 3. The beadings merge into collar portions 6 which are directed towards the axis of the body. In an assembled mounting a bolt 7 carrying two pressure discs 8 is inserted in the inner sleeve 2 and these discs when a nut 9 is tightened, compress the rubber body and thereby produce a stressed condition. In this condition, the part 1' of the rubber body located between the sleeves 2 and 3 is expanded away from the sleeve 2, and the overall length of the rubber body is shortened, but the shortest length of the inner part 1 of the rubber body should still be longer than the outer ring. This relative dimensioning in the stressed condition of the body is effected by provision of truncated cone-shaped recesses 15. Under the effect of an axial force the collar portions 6 are first deformed by bending, and finally the beadings 5 are subjected to compressive stress. When subjected ot shear forces, the portion of the rubber body in the region of the inner sleeve 2, expands along the sleeve 2 and, since rubber when subject to shear deformation is relatively soft, axial movement occurs although friction between the rubber body and the inner sleeve 2 is substantially prevented.

The rubber body, the inner sleeve 2 and the outer ring 3 may be divided into sections substantially in a plane 10. A preferred form of the rubber body is shown in Figs. 3 and 4, wherein two rubber parts are provided with extensions 11 and 12 each being of the same axial length as the outer ring 3. The inner extension 12 has a rib 13 which is firmly interlocked in a corresponding groove in the outer extension 11. In this embodiment the beadings 5 are additionally retained by annular ribs 14 engaging in recesses in the end faces 4 of the outer ring 3.

WHAT WE CLAIM IS: —

1. A resilient mounting, more particularly for the engine of an automotive vehicle, the mounting comprising an inner sleeve and a substantially shorter outer ring with an annular rubber body clamped therebetween, the rubber body comprising an inner part located substantially between the outer ring and inner sleeve and having an annular beading at each of two end regions which extend beyond the inner diameter of the outer ring with said beadings being supported on radial end faces of the ring, wherein the inner part has a substantially frusto-conical recess at each end face and is shorter than the inner sleeve but longer than the outer ring; each beading being provided with a collar portion extending towards the central axis of the rubber body and tapering into a lip.

2. A mounting according to claim 1, wherein the outer surfaces defining the collar portion of the beadings are of a frusto-conical shape with the smaller ends of the cones facing away from each other.

3. A mounting according to claim 1, wherein in the unstressed state of the rubber body, an outer surface of each beading is at a right angle to the outer surface of its collar portion.

4. A mounting according to any one of the preceding claims, wherein the rubber body consists of two parts each with a beading, the said parts having a parting plane within the outer ring.

5. A mounting according to claim 4, wherein the two parts are provided with hollow-cylindrical telescopic extensions, the axial lengths of which are substantially the same as the outer ring.

6. A mounting according to claim 5, wherein the two extensions interengage by

means of a projection on one and recess on the other.

7. A mounting according to claim 4, wherein the inner and/or the outer ring is/are parted along the parting plane of the rubber body.

8. A mounting according to claim 1, wherein the beadings have ribs which engage in annular grooves of the radial end faces of the outer ring.

9. A mounting substantially as herein described with reference to and as illustrated in the accompanying drawings.

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1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.

FIG.1

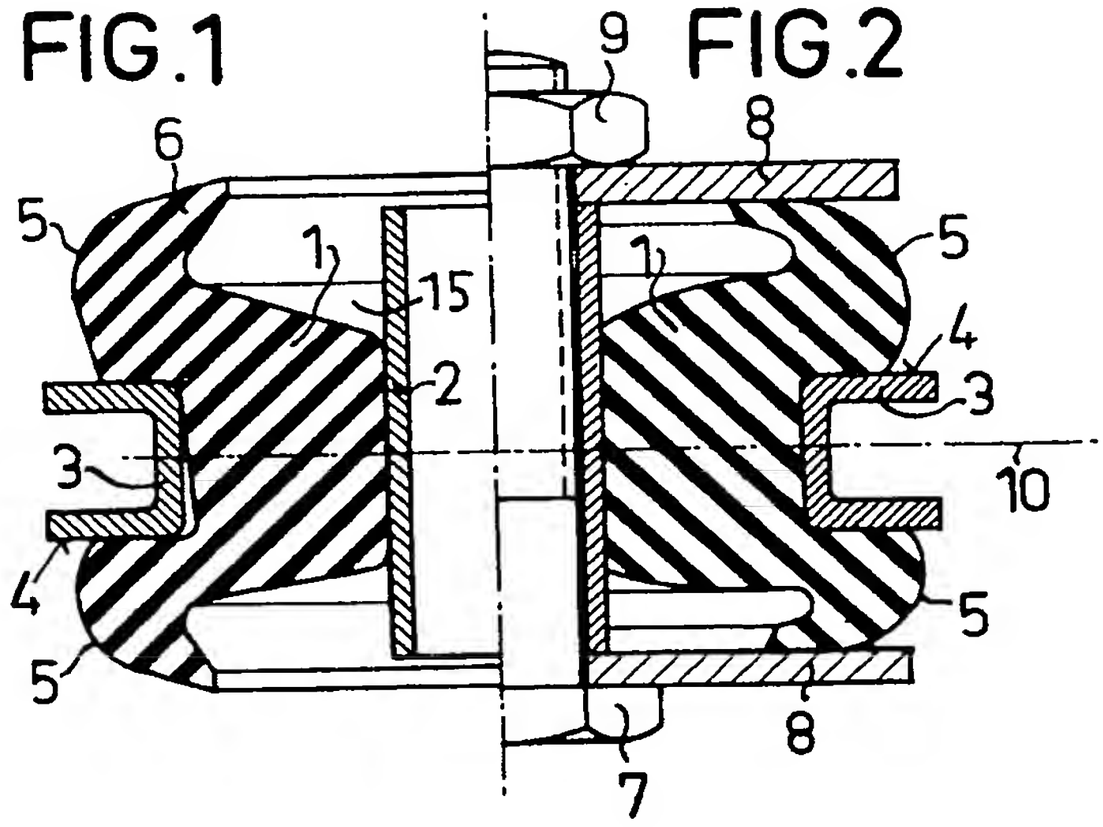

FIG.2

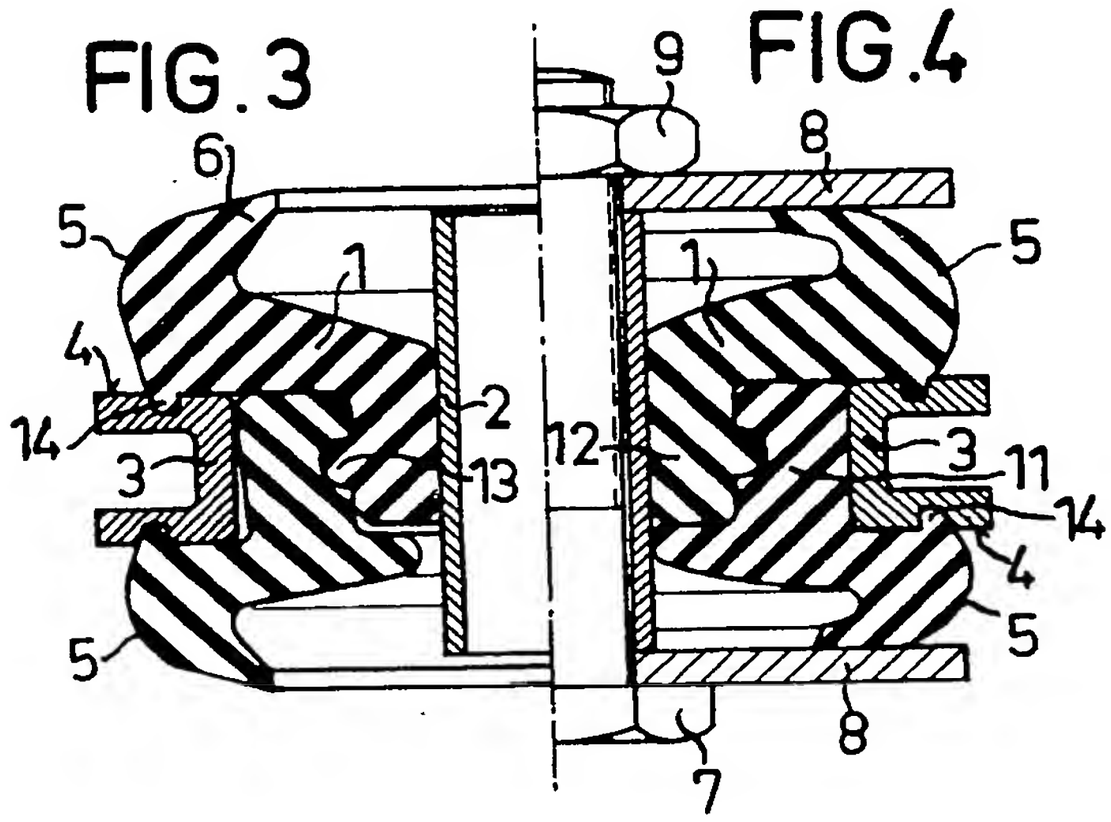

FIG.3

FIG.4